Brit. J. vener. Dis. (1957), **33**, 70.

EPIDEMIOLOGY OF GONORRHOEA IN FINLAND FROM 1953 TO 1955*

BY

A. S. HÄRÖ AND R. PÄTIÄLÄ

Finnish Board of Health and Dermato-Venereological Department of University of Helsinki

Contrary to expectation, the study of the epidemiology of gonorrhoea has again become timely. A few years ago, it seemed probable that the new therapeutic methods would be able to conquer the disease, but we must now admit that this hope has not been realized. Attention has therefore been paid recently to the gonorrhoea problem in the Nordic countries (*e.g.*, Flodén and Tottie, 1955) and elsewhere, notably in the United Kingdom, where in particular the social aspects of the infection have been discussed (Nicol, 1955).

The sexual habits of an entire nation change but slowly and generally they stubbornly defy imposed moral laws and other rules, no matter how strict these may be. It is apparent that venereal diseases cannot be mastered in this way within a brief period. In practice, therefore, only one possibility remains: the prevention of the transmission of the pathogenic organism from individual to individual, from place to place, and from country to country.

Material

The earlier venereal disease statistics in Finland contain very little detailed information about the patients. Since 1953, however, an individual report has been made in each case, giving information both on the disease and on the patient's age, occupation, and other data. The present authors were in a position to study 14,581 original reports made in the period 1953 to 1955.

Our material comprised 78 per cent. of the cases reported in the whole country in 1953, 92·4 per cent. of those reported in 1954, and 94 per cent. of those reported in 1955. These figures are therefore representative of the official statistics for Finland. Cases of gonorrhoea occurring in the army were also included. This material was analysed under the following headings:

A. Total Incidence. Sex Ratio.—The figures available for the total number of cases of gonorrhoea are not very reliable, for they are greatly influenced by various factors.

Fig. 1 shows the number of male and female cases of gonorrhoea reported officially in Finland for the period from 1938 to 1955, and includes those diagnosed in the armed forces in peace and war (Putkonen, 1948). It also indicates that a kind of equilibrium exists at present, with the disease showing no signs of decrease.

During the period 1938 to 1955 the sex ratio has varied between 1 : 2·5 and 1 : 4·5, and in the past few years it has once more approached the pre-war level. The rate of morbidity in women as compared with that for men was 1 : 3·6 in 1953, 1 : 3·2 in 1954, and 1 : 3·3 in 1955.

B. Age at Onset of Disease.—For the earlier years, no detailed information is available for the whole country on the age grouping of the patients. With a venereal disease, marriage is an important factor. Table I and Figs 2 and 3 show the cases for 1955 distributed not only by age and sex but also by marital status.

TABLE I

CASES OF GONORRHOEA IN FINLAND BY AGE, SEX, AND MARITAL STATUS (1955)

Age Group (yrs)	Men		Women		Total
	Married	Unmarried	Married	Unmarried	
15–19	7	346	13	199	565
20–24	125	1,098	68	279	1,570
25–29	264	857	82	216	1,419
30–34	187	405	60	107	759
35–39	133	185	44	66	408
40–44	96	101	34	58	289
45–49	49	63	22	32	166
50–69	24	47	9	23	103
Total	885	3,082	332	980	5,279

For unmarried persons, both male and female, the danger of infection is greatest at a relatively late age, *i.e.*, at the age of about 30 years for men and about 25 years for women. In the group of married persons, the morbidity decreases with age, and in the older age groups, it is considerably smaller than in the corresponding groups of unmarried persons.

C. Marital Status.—Figs 2 and 3 show the age and marital status of the male and female patients separately. The number of cases per 1,000 of population was higher for the unmarried, with the single exception of married persons under 20 years. The groups were small, it is true, but it may be noted that the ratios were similar in 1953, 1954, and 1955 and were statistically significant.

D. Occupation.—Usually, the occupation of the patient was not stated in the reports with sufficient accuracy to permit a detailed analysis. It was nevertheless possible to segregate certain occupations, already noted in previous papers on the venereal disease situation in Finland

* Invited article, received for publication January 22, 1957

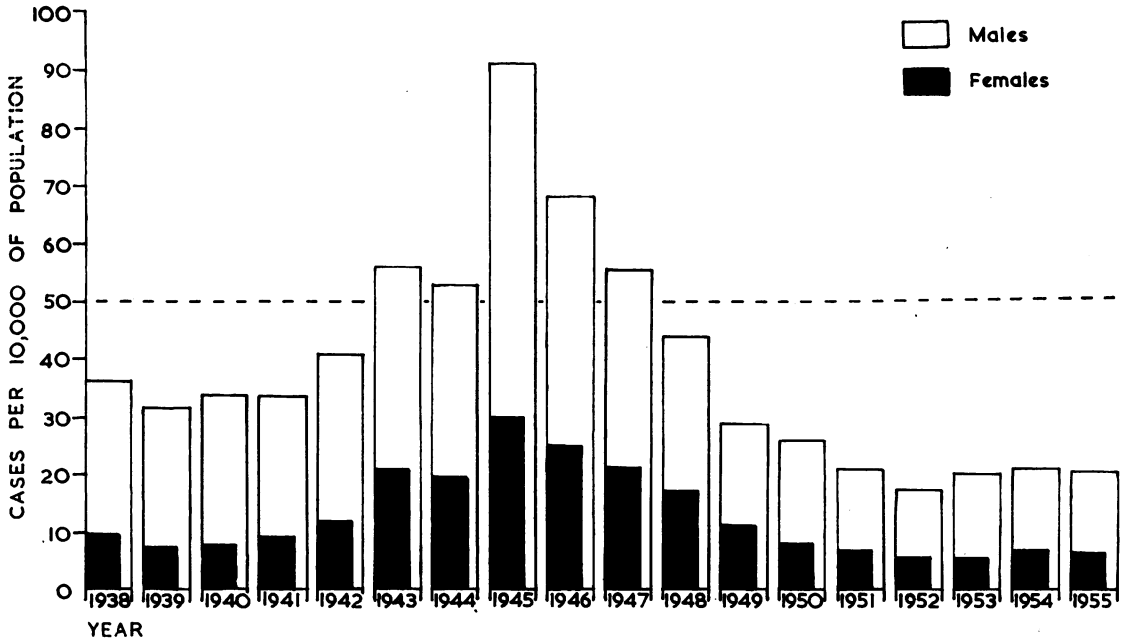

FIG. 1.—Morbidity from gonorrhoea in Finland by sex and year, per 10,000 of population, 1938 to 1955.

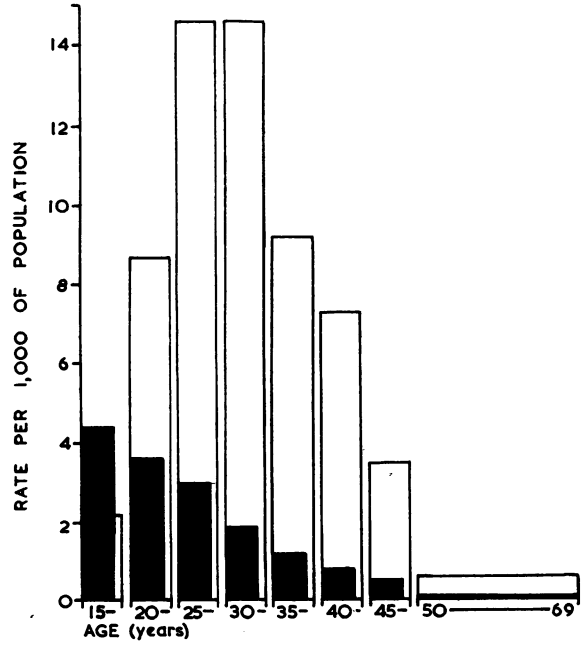

FIG. 2.—Age-specific morbidity rates from gonorrhoea of married and unmarried men in Finland, per 1,000 of population of the same age and marital status.

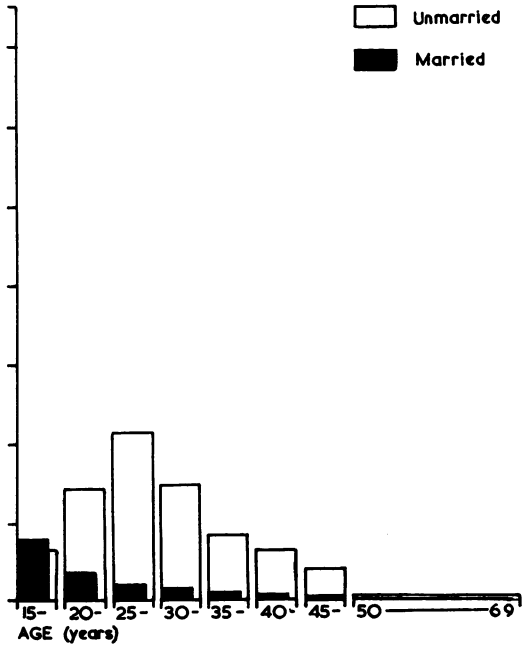

FIG. 3.—Age-specific morbidity rates from gonorrhoea of married and unmarried women in Finland, 1955, per 1,000 of population of the same age and marital status.

(Putkonen, 1951; Härö and Pätiälä, 1954). The reports on 14,581 patients in the years 1953 to 1955 included 1,456 (10·0 per cent.) seamen and 1,147 (7·8 per cent.) motor-car drivers or railway personnel; restaurant personnel numbered 528 (3·6 per cent.); other non-clerical workers totalled 8,397 (57·6 per cent.), and persons of additional occupations 21·0 per cent. The population census in Finland in 1950 showed the total number of employed persons to be 43·3 per cent., of whom 7,287 (0·6 per cent.) were seamen (deck and machine hands), and 6·6 per cent. were workers in other forms of transport.

On the basis of our present statistics, the gonorrhoea morbidity rate among seamen was approximately sixteen times greater than their proportion to the total population. Motor-car drivers also had a morbidity rate well above the average. Other occupations involving travel, *e.g.*, salesmen, bricklayers, painters, sheet-metal workers, etc., were also prominent in the statistics.

E. (1) Place of Infection and Treatment.—The official statistics of Finland give relatively detailed data for each patient on the locality in which the infection was acquired and the treatment received. Table II shows the cases of gonorrhoea distributed according to the locality in which the disease was treated.

TABLE II

CASES OF GONORRHOEA REPORTED FROM 1953 TO 1955 IN FINLAND, BY LOCALITY (OF TREATMENT)

Locality	Total No. of Cases			Yearly Rate per 1,000 of Population		
	Males	Females	Total	Males	Females	Total
Helsinki	5,080	1,925	7,005	9·7	2·8	5·8
Turku (Port)	1,559	396	1,955	10·6	2·2	6·0
Other Ports	1,423	441	1,864	3·5	0·9	2·1
Tampere (Industrial Centre)	789	152	941	5·4	0·8	2·9
Other Inland Towns	797	258	1,055	2·4	0·7	1·4
Market Towns	863	277	1,140	2·1	0·6	1·3
Rural Districts	1,934	590	2,524	0·5	0·1	0·3
Whole Country	12,445	4,039	16,484	2·1	0·6	1·3

The distribution according to the place of treatment clearly indicates that the incidence of gonorrhoea is relatively higher in towns, especially in the bigger towns with a large port (Helsinki, Turku). The inland industrial town of Tampere had a considerably smaller number of cases and in rural districts there were very few. This division is all the more evident when cases are divided up according to the locality in which infection was acquired (Table III).

It is obvious that, in the epidemiology of venereal diseases, rural districts and small towns are insignificant and that large towns and cities play a decisive part in the problem. The percentage of cases arising from infection acquired abroad is quite small; on the other hand, shipping is principally concentrated in the large ports in Finland where the incidence of gonorrhoea is highest. In this country, prostitution is practically impossible except in a few of the largest towns.

TABLE III

PERCENTAGE DISTRIBUTION OF ANNUAL NUMBER OF CASES OF GONORRHOEA ACCORDING TO PLACE OF INFECTION

Locality	1953	1954	1955
Helsinki	48	47	48
Turku	13	13	10
Other Ports	9	10	10
Tampere	7	6	6
Other Inland Towns	8	9	8
Market Towns	5	5	5
Rural Districts	5	4	6
Foreign Countries	5	6	7
Total	100	100	100

E. (2) Travel and Infection.—Tables II and III show that infection is frequently acquired in towns. Table IV divides the places of infection into three, *i.e.*, patient's place of residence, other localities in Finland, and other countries. The percentages are calculated separately for patients residing in Helsinki and in the country as a whole. It will be observed that persons residing in large towns acquire the infection most frequently in their home locality; women, too, are chiefly infected in the area in which they live. Travel has a fairly important significance for persons residing in the smaller population centres and especially in rural areas. About 50 per cent. of the seamen acquire the infection abroad (1955, 50·4 per cent.). In most groups there appears to be an increase in the number of cases infected away from the home locality, as may be expected in view of the rapid development of communications.

TABLE IV

PERCENTAGE DISTRIBUTION OF ANNUAL NUMBER OF CASES OF GONORRHOEA ACCORDING TO DISTANCE TRAVELLED

Place of Infection	Year	Helsinki			Whole Country (including Helsinki)		
		Males	Females	Total	Males	Females	Total
Domicile	1953	86	96	89	71	90	75
	1954	81	96	85	63	88	68
	1955	83	84	83	66	73	68
Other Places in Finland	1953	9	3	7	22	9	19
	1954	13	3	10	30	11	26
	1955	11	15	13	26	26	26
Other Countries	1953	5	1	4	7	1	6
	1954	6	1	5	7	1	6
	1955	6	1	4	8	1	6

E. (3) Infections Acquired Abroad.—Most cases of infection imported into Finland have been acquired in ports in the Baltic and North Sea areas (Table V). Copenhagen and certain Polish and East German ports predominate in the statistics. Unexpectedly few cases originated from other Scandinavian countries, and not a single case was acquired in the Soviet Union. When the incidence is calculated in proportion to the tonnage of the ships from these ports to Finland, the differences are greatly equalized, while Sweden's share as a source of infection becomes fairly insignificant (Table VI).

TABLE V

NUMBER OF CASES OF GONORRHOEA ACQUIRED IN PORTS OF FOREIGN COUNTRIES

Country	Port	Number of Cases
Denmark	Copenhagen	51
	Korsör	2
	Odense	2
Poland	Stettin	62
	Danzig	32
	Gdynia	14
Eastern Germany	Rostock	8
Federal Germany	Bremen	9
	Hamburg	16
	Lübeck	7
	Kiel	5
Holland	Rotterdam	9
	Amsterdam	8
Belgium	Antwerp	6
Sweden	Stockholm	7
	Gothenburg	1
United Kingdom (Total)	—	25
Norway	Oslo	3*
France	Rouen	5
Rumania	—	1*
Italy	—	3*
Spain	—	2*
Outside Europe	—	4*
	Total	286

*These cases are not included in Table VI.

TABLE VI

CASES OF GONORRHOEA IMPORTED FROM DIFFERENT PORTS IN RELATION TO SHIP TONNAGES (1955)

Ports	No. of Cases	Tonnage (1,000 Tons)	Cases per 100,000 Tons
Poland (Stettin, Gdynia, Gdansk)	112	815	13·8
Western Germany, North Sea	25	350	7·1
Denmark (Copenhagen)	55	809	6·8
Eastern Germany (Rostock)	8	143	5·6
France (Rouen)	5	94	5·3
United Kingdom	25	490	5·1
Western Germany, Baltic Sea	12	247	4·9
Netherlands (Rotterdam, Amsterdam)	17	416	4·1
Belgium	6	220	2·7
Sweden	8	1,750	0·5

F. Source of Infection.—Table VII shows for the whole country where the source of infection was encountered. Restaurants evidently continue to be the most usual place, especially for men. There does not appear to be any notable difference in this respect between the married and the unmarried. The contribution of street prostitution appears to decrease year by year in both the male and the female groups. Dance halls are significant for the single persons, but the majority of married women obtain the infection at home, evidently through the husband. The unmarried women include a considerable proportion of prostitutes or of women leading an otherwise irregular life who are frequently sent for treatment by local authorities. As may be expected, they generally give no details concerning the origin of their infection.

Secret prostitution on board ship has previously played a highly significant part in the spread of gonorrhoea among seamen. Putkonen (1951) found that, in the years 1948 and 1949, the percentage of cases of venereal disease

TABLE VII

PERCENTAGE DISTRIBUTION OF ANNUAL NUMBER OF CASES OF GONORRHOEA ACCORDING TO SOURCE OF INFECTION

Place	Year	Men		Women	
		Unmarried	Married	Unmarried	Married
Restaurant	1953	31	33	8	6
	1954	30	32	6	4
	1955	30	30	8	3
Street	1953	24	21	7	5
	1954	19	15	4	4
	1955	17	15	3	1
Home	1953	8	15	25	62
	1954	6	11	19	61
	1955	2	19	12	62
Dance Hall	1953	13	3	6	2
	1954	13	3	4	1
	1955	13	4	7	1
Other or Unknown	1953	24	28	54	25
	1954	26	35	69	30
	1955	38	40	70	32

among seamen acquired from ship prostitutes was as much as 44·2. The result for 1953 showed 33 seamen infected on board in the home ports; this corresponds to 8·1 per cent. of all cases among seamen. In 1954 and 1955, these figures were 41 (8·1 per cent.) and 41 (8·2 per cent.), respectively, which would indicate that no progress has occurred during the past few years, although the situation has improved greatly compared with that prevailing in the immediate post-war period. Ship prostitution is greatest in Helsinki and Turku, but is also found in minor ports. It occurs as well in other countries: Copenhagen and certain British ports are constantly reported in this connexion.

As stated earlier, restaurants continue to be places where temporary relations leading to venereal infection most commonly begin. The part played by alcohol as a contributory factor cannot be determined on the basis of our material, but certain conclusions may be drawn concerning the types of restaurants which have been reported in connexion with the acquiring of infection. In Finland, class I and II restaurants have either a full or a limited licence to serve alcohol; the limited licence only permits the serving of wine and beer, or of beer alone. In addition, there are restaurants in five price categories. It is extremely difficult to obtain any information on the number of restaurant guests, and the figures given in Table VIII therefore relate to types of restaurants without consideration of size. Statistics on this basis naturally give only an approximate picture of the correlation between restaurants and venereal diseases. It would seem, however, that fully-licensed restaurants in the lowest price category definitely contribute the most cases. Among wine restaurants, price category III is the most significant in this respect, but restaurants with beer licences only do not appear to be very important. However, the fact that a restaurant serves alcohol does not in itself make it a black spot, but the location of such a place together with its price category and internal conduct do appear to exercise much influence.

TABLE VIII

PERCENTAGE DISTRIBUTION OF CASES OF GONORRHOEA IN HELSINKI ORIGINATING IN RESTAURANTS FROM 1953 TO 1955, ACCORDING TO TYPES OF RESTAURANTS

Price Category	Class of Licence		
	Full		Beer and/or Wine
	I Class	II Class	
Elite	0·4	—	—
I	2·0	—	0·3
II	2·6	—	5·0
III	5·3	1·0	10·4
IV	16·0	33·0	3·0

Although there are no actual slums or sections of ill repute in Finnish towns, the statistics reveal certain areas in which infection is commonly spread. There is more street prostitution on certain streets, and the restaurants shown in Table VIII are also located close to each other in a few groups. The small number of temperance restaurants which are concerned in this respect are situated in their immediate vicinity.

G. Time of Infection.—It has been known for a long time that the largest number of cases of gonorrhoea occur in Finland during the late summer. Since the difference between summer and winter is very marked in Finland, the opinion has frequently been advanced that the fluctuation seen in the incidence of venereal diseases is a direct result of climatic conditions. The present authors have in an earlier paper (Härö and Pätiälä, 1954) suggested that this is rather a result of annual holidays and travel. Fig. 4 shows the total number of cases acquired monthly as percentages of the mean for the respective year. The curves for the different years are very similar, with an abrupt rise from June to July and the peak in July to August.

H. Reasons for Seeking Treatment.—Our material contained information on the main reasons why patients sought medical aid (Table IX). Practically all the men consulted a physician after observing symptoms, and there were no significant differences between the married and single. Of the women, a large proportion were asymptomatic when they consulted a physician, evidently at the suggestion of the partner, and not even one-half of the patients had observed symptoms. About a quarter of the women were sent in for treatment by the authorities, and about one-tenth as a result of the investigation of contacts.

TABLE IX

REASONS FOR BEING TREATED IN A GIVEN YEAR, 1955, SHOWN AS PERCENTAGES OF THE TOTAL

Reason		Males		Females	
		Unmarried	Married	Unmarried	Married
Own Initiative	Asymptomatic	1·2	2·6	20·3	23·2
	Symptomatic	98·3	96·6	40·2	45·3
Reported as Carrier ..		0·3	0·8	13·8	8·3
Sent by Authorities ..		0·2	—	25·7	23·3

I. Incubation Period (Figs 5 and 6).—In the neighbouring country, Sweden, Flodén, and Tottie (1955) expressed the opinion that the incubation period of the disease had become considerably longer, and that this might have had an important effect on the gonorrhoea situation in Sweden. To clarify this point, we compared the data in the present series with those for the period June 21, 1946,

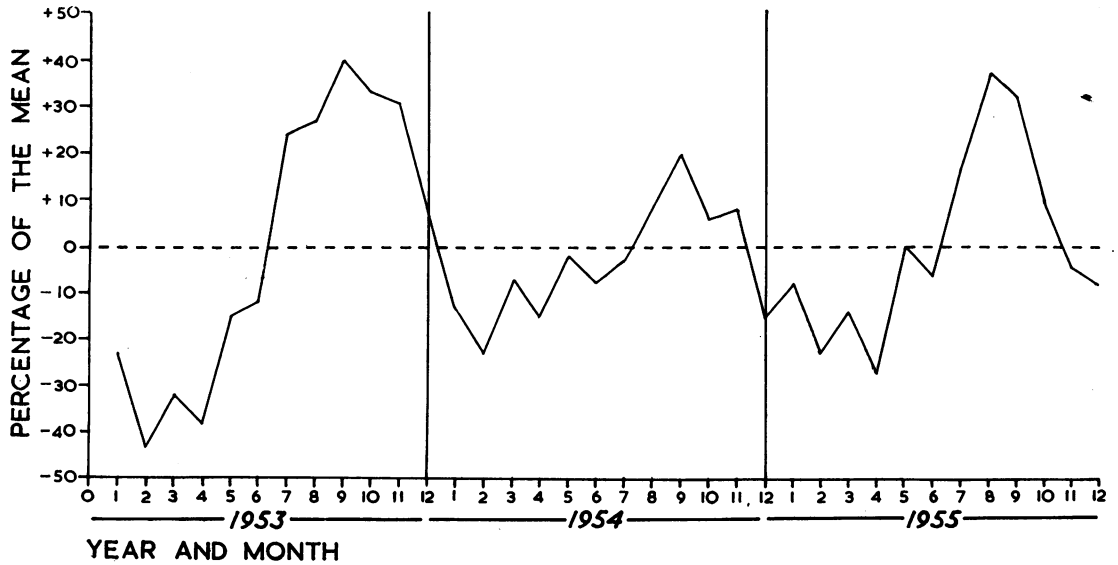

FIG. 4.—Number of cases of gonorrhoea reported monthly, as a percentage of the mean (1953–1955).

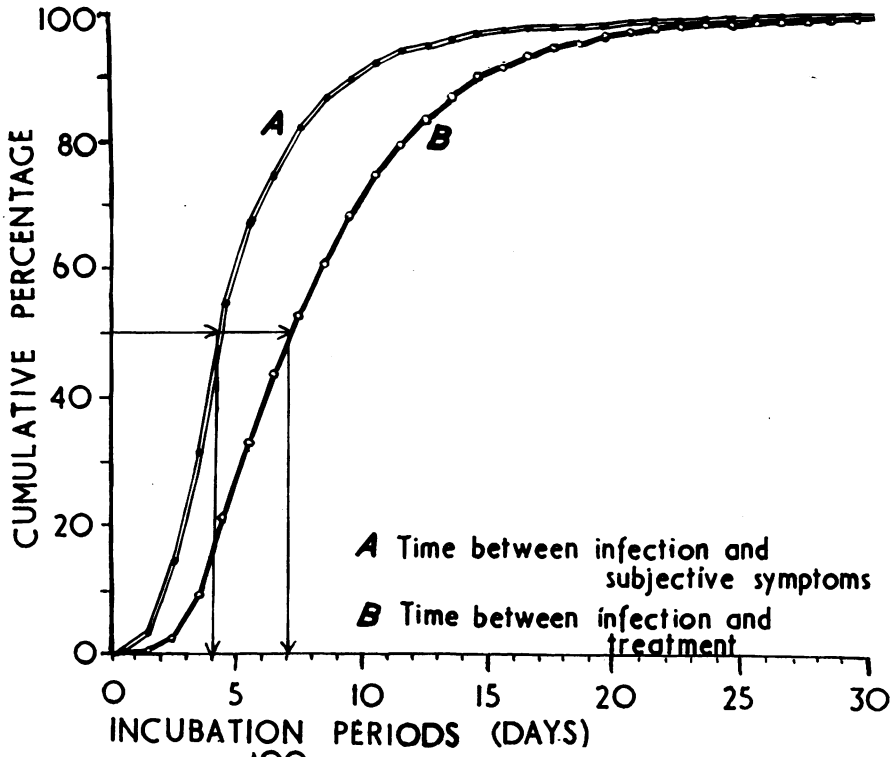

FIG. 5.—Cumulative percentage distribution of length, in days, of incubation periods of male cases of gonorrhoea, 1946–47.

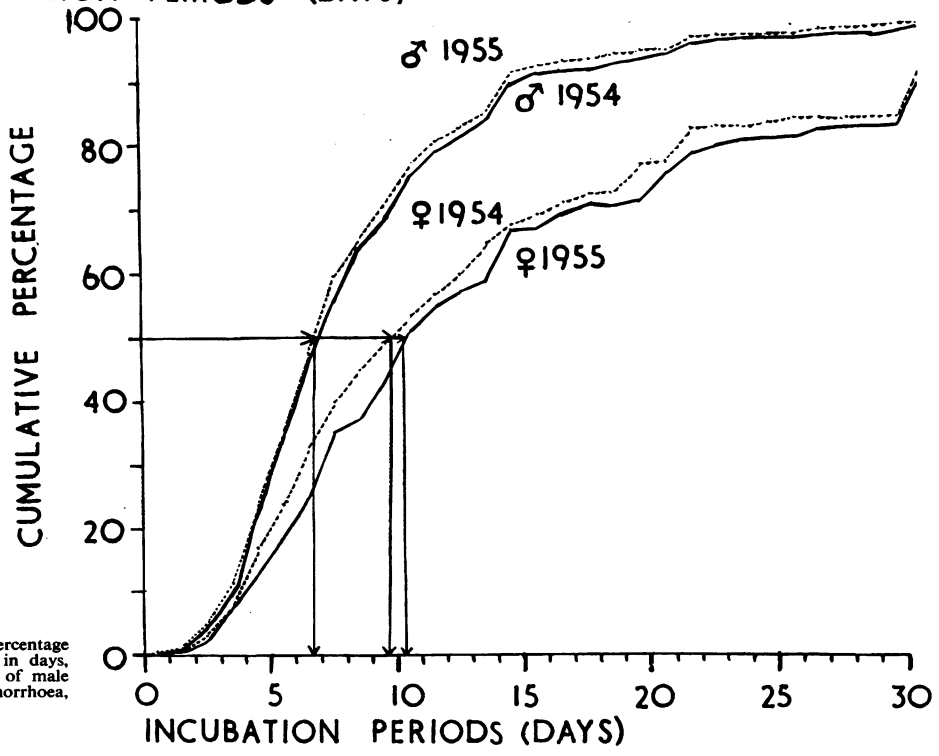

FIG. 6.—Cumulative percentage distribution of length, in days, of incubation periods of male and female cases of gonorrhoea, 1954 and 1955.

to July 31, 1947, when penicillin for the treatment of gonorrhoea was introduced in the Helsinki Venereal Diseases Out-patient Clinic for Men.

On the basis of 1,092 cases reported in 1946–47, 50 per cent. of the infected persons observed subjective symptoms—usually a discharge or a smarting sensation—not later than 4·3 days after acquiring the infection. In 82·2 per cent. of cases, symptoms were seen within one week at the latest (Fig. 5).

In our series for 1953–55, the incubation period could not be calculated in this manner, but the objectively observed incubation period could be determined, *i.e.*, the time which elapsed between acquiring the infection and consulting a physician (Fig. 6). The calculated mean objective incubation periods are shown in Table X.

TABLE X

MEAN OBJECTIVE INCUBATION PERIODS OF GONORRHOEA, BY SEX AND REGION

Year	Males		Females	
	Helsinki	Whole Country excluding Helsinki	Helsinki	Whole Country excluding Helsinki
1946–47	7·19	—	—	—
1954	6·73	7·08	9·41	9·73
1955	7·03	7·09	10·30	10·43

These series do not indicate that the incubation period for male patients has become any longer, but rather the opposite. Although the differences between the observed incubation times in the two periods 1946–47 and 1955 are greater than would be caused by chance ($\chi^2 = 40·2$; $f = 16$; $P < 0·001$), they may as well be due to other causes than an actual change in the "genius epidemicus".

For women, the information is much less reliable, because 36 per cent. of the women were quite unable to say when the infection had been acquired, a state of affairs which was found in only 9 per cent. of the men. The female cases in 1954 and 1955 also show a greater difference than would probably be due to chance ($P < 0·005$), but this observation does not, in our opinion, carry much weight because the "incubation period" in most female cases reflects chiefly the vigilance of the authorities. The fact that no significant change ($P < 0·80$) is demonstrable for male patients during the 2 years in question points in the same direction.

Our series does not therefore provide evidence to support the idea of a prolongation of the incubation period, and since a relatively large proportion of these cases acquired the infection abroad, it does not seem probable that such changes have occurred to any marked extent in other countries either.

Discussion

It is evident that it has not been possible to apply, as effectively as could have been wished, the new methods of treatment available for the prevention of gonorrhoea when post-war conditions became more settled. What is the reason for this? The Venereal Disease Act in Finland, which assures free treatment for the patient, probably has not in itself been unsuccessful. The network of medical officers is so large that this cannot be regarded as a reason for the slow progress. The drugs and dosages used meet the generally accepted norms.

Contact Tracing.—In 1953, only 30 per cent. of the patients were able to state the name of, or otherwise identify, the carrier of the infection, but nearly all reported persons were brought under treatment by the public authorities. Although patients are reluctant to reveal such information to persons other than physicians, and physicians, again, are not inclined to "play policemen", the seeking of the sources of infection could probably be made more effective. With this end in view, contests were arranged for finding carriers of infection and prizes were given to the most successful medical officers. Although participation in the contests was active, no obvious benefit resulted. It is necessary to continue to improve the tracing of contacts, but it is also obvious that decisive results cannot rapidly be reached by this means.

Educational Work.—If the purpose of educational work is considered to be merely the teaching of the recognition of the symptoms, it will have no appreciable bearing on the incidence of the disease. Nearly 100 per cent. of the men seek treatment because of symptoms, and women arrive on the recommendation of the partner, or through official measures, or for other reasons. In our opinion, therefore, a knowledge of the symptoms would hardly bring patients under treatment earlier. Furthermore, they are not only young persons, for morbidity is relatively highest between the ages of 25 and 35 years. An unexpected finding was that the incidence among married persons was highest in the youngest age groups; indeed, in the group below 20 years, it was higher for married than for single men. On the other hand, educational work in a broader sense, addressed to certain population groups, could be important. One of these groups comprises seamen, whose social conditions and leisure pastimes could be developed. For instance, there is hardly any organized entertainment for sailors in Finland, much less for those of other nationalities visiting Finnish ports. Other educational work is desirable to raise the moral standards and sense of responsibility, since the fear of venereal disease as a preventive factor has nearly disappeared.

Activities of Public Officials.—The exceptionally wide powers that are granted by the Venereal Diseases Act to the public authorities could be

applied more effectively. There appears to be fairly extensive prostitution in the Finnish ports, certain restaurants are all too frequently cited as the places of encounter, and in some dance halls supervision is inadequate. On the other hand, the venereal disease situation in this country is not so critical as to give a reason for the general enforcement of public health with the aid of the police force.

Isolation Measures.—Isolation, one of the standard epidemiological measures, is not, in the usual sense at least, a serviceable tool in the prevention of gonorrhoea, *e.g.*, the isolation of vagrant elements and prostitutes in hospitals or other institutions for some length of time would cause the supply and demand to seek equilibrium in other ways. Such a situation, we fear, would be no happier than the present one. It would also discourage the carriers of infection from seeking treatment. On the other hand, a less drastic isolation can be effected, for example, by a more definite policy concerning restaurants. Care should be taken that restaurants which are subject to suspicion in this respect cannot develop into premises which tempt travellers, holiday spenders, and summer bachelors. Co-operation between the public authorities and restaurant owners could give more satisfactory results.

Diagnosis and Treatment.—A diagnosis of gonorrhoea is not always readily made, and mistakes have occurred; *viz.* the disease, especially in women, is sometimes not recognized at all, and in men some cases of non-specific urethritis are diagnosed as gonorrhoea. An error of the latter category does not signify a danger from the epidemiological aspect, but unrecognized cases of gonorrhoea in women are to be considered the more dangerous. Cultures and other laboratory methods should continue to be developed but there is also reason to give treatment in doubtful cases on broader indications than formerly, in order to be on the safe side.

International Cooperation.—Venereal diseases in particular demonstrate the truth of the old maxim: "By helping yourself you will help others". In a country of the size of Finland, the reservoirs of infection would become depleted in the absence of continued replenishment from abroad. Conversely, Finland, for its part, supplements the reservoirs in large traffic centres, especially ports. It is desirable, of course, that the sources of infection in other countries should be reported to their respective public authorities for the institution of necessary control measures. The value of this cooperation is greatly limited because the information usually arrives too late, and the informants generally are unable to give adequate and accurate information concerning foreign cities, especially if they do not know the language of the country concerned. We are of the opinion that the most natural and most effective form of cooperation is the institution everywhere of measures against the foci of infection which should be destroyed or at least isolated.

Summary

The epidemiology of gonorrhoea in Finland has been studied by analysing the individual reports made on 14,581 cases of gonorrhoea in the period 1953 to 1955.

The number of cases was smaller than in the pre-war period, but during the past few years there has been no decline. The role of marital status, the age and sex of the patients, and the place of infection were studied; 47 to 48 per cent. of the cases were infected in Helsinki, only 5 per cent. in rural districts, and an increasing number of from 5 to 7 per cent. in other countries.

The part played by travel was evident in several ways: the monthly rhythm in the incidence revealed a clear rise at the beginning of the holiday season; and the patients' occupations involved travel, *e.g.*, salesmen, motor-car drivers, and certain handicraft workers.

The place where the carrier of the infection was encountered was most commonly a restaurant, specifically a restaurant in the lower price category, but with a full licence to serve alcohol. Restaurants serving beer were among those least guilty in this respect. The part played by street prostitution appeared to be decreasing.

Intensified contact tracing, educational work, isolation measures, activity of the authorities, and skilled diagnosis and treatment can improve the situation only slowly and to a limited extent. International cooperation should, in our opinion, be based chiefly on the paradox: "By helping yourself you will best help others".

REFERENCES

Flodén, C. H., and Tottie, M. (1955). *Svenska LäkT.*, 52, 2839.
Härö, A. S., and Pätiälä, R. (1954). *Ann. Med. exp. Biol. Fenn.*, 32, Suppl. 10.
Nicol, C. S. (1956). *British Journal of Venereal Diseases*, 32 27.
Putkonen, T. (1948). *Suom. sotilaslääketiet. AikL.*, 23, 4.
——(1951). *Bull. Wld Hlth Org.*, 4, 121.